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EXAMINER

VLACHOS, SOPHIA

ART UNIT

PAPER NUMBER

2611

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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3 MONTHS

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

## Office Action Summary

Application No.

10/616,796

Applicant(s)

GIBSON ET AL.

Examiner

SOPHIA VLAHOS

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 25 January 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-9, 11-16, 18, 19, 21-54 and 56-59 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9, 11-16, 18, 19, 21-54 and 56-59 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- 1) ☐ Certified copies of the priority documents have been received.
  - 2) ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Allowable Subject Matter***

1. The indicated allowability of claims 17, 20, 55 is withdrawn in view of the newly discovered reference(s) to Phillips et. al. (U.S. 5,859,878).

Rejections based on the newly cited reference(s) follow.

### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-9, 11-16, 18-19, 21-54, 56-59 are rejected under 35 U.S.C. 103(a) as being unpatentable over Phillips et. al. (U.S. 5,859,878) in view of Murphy et. al. ("Satellite-Based Guidance for Precision Approach and Landing of Commercial Aircraft", 1998 GPS Solutions)

With respect to claim 1, Phillips et. al. disclose: a front-end circuit operable to receive a plurality of radio signals transmitted across a frequency band and generate an analog signal corresponding within said frequency band (Fig. 3A, front-end includes blocks 102 104 see column 25, lines 31-38 where the AIU receives LOC and GS analog signals from the respective antennas, column 25, lines 47-53 where a NB analog signal is generated); an analog to digital converter coupled to said front-end circuit, said

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analog to digital converter operable to receive and convert said analog signal to a digital signal (column 25, lines 49-52, narrowband ADC 202 see Fig. 3A); and a digital processing system coupled to said analog to digital converter, said digital processing system operable to receive said digital signal and generate at least one output signal within said frequency band (see Fig. 1, block 106b, also shown in Fig. 3A, see column 23, lines 5-7, 24-28), said digital processing system comprising: a digital down converter (Fig. 3A, block DDC, details shown in Fig. 8A, digital downconverter 210, column 23, lines 5-7, column 26, lines 29-31, the control words are used to frequency control the DDC); and a digital signal processor operable to extract information generate said at least one output signal (Fig. 8A, DSP 216, column 10, lines 49-63, decoding operation), wherein said digital signal processor controls said digital down converter (see column 26, lines 41-43, the DSP controls the DDC see also lines 29-31 where control words are used to control frequency translation).

Phillips et. al. do not expressly teach: a plurality of channels within said frequency band; a digital processing system operable to generate at least one output signal corresponding to at least one of said plurality of channels; a digital down converter operable to select said at least one of said channels within said frequency band; and a digital signal processor operable to extract said at least information from said at least one of said channels.

In the same field of endeavor, Murphy et. al. disclose: a plurality of channels within said frequency band (see page 21, middle of right side column, where in the VHF

band (frequency range of 108.10-111.95MHz) exist 40 Localizer channels, see also 40 glideslope channels in another frequency range).

Therefore at the time of the invention, it would have been obvious to a person skilled in the art based on the teachings of Muprhy et. al. that the system of Phillips includes a plurality of channels within said frequency band (40 channels of LO or 40 channels of GS), and therefore it would have been obvious to a person skilled in the art to modify the system of Phillips et. al. so that the a digital processing system is operable to generate at least one output signal corresponding to at least one of said plurality of signals; the digital down converter is operable to select said at least one of said channels within said frequency band; and the digital signal processor operable to extract said at least information from said at least one of said channels, i.e. process the channel out of the 40 channels of the LO or GS received signals that is used, and the motivation to perform the above modification is to extract information from the specific channel (out of the plurality of channel in the frequency band) that is used i.e. contains useful information.

With respect to claim 2, Phillips et.al., further disclose: wherein said digital processing system generates a single output signal comprising a time-domain multiplexed serial data link (see Fig. 8B, (coupled to the system of 8A) where a serial interface is used to supply signals to the computer, see column 7, lines 47-52 , and see Fig. 6, column 23, liens 34-36 where the signal processing (ILS processing) is performed in a TDM fashion).

With respect to claims 3 and 4 all of the limitations of claims 3 and 4 are rejected above in claim 2 (the plurality of signals are generated by the UART and supplied to the plurality of components in computer 112 (the plurality end devices) as shown in Fig.8B).

With respect to claim 5, Phillips et. al., further disclose: wherein said front-end circuit comprises an antenna circuit operable to receive said radio signals (see column 25, lines 36-37 LO, MB, and GS antennas).

With respect to claim 6, Phillips et. al., further disclose: wherein said front-end receiver further comprises an amplifier circuit operable to amplify said received radio signals (column 20, lines 58-67, see signal amplification).

With respect to claim 7, Phillips et. al. further disclose: wherein said front-end circuit further comprises a filter circuit operable to filter said received radio signals (column 20, lines 58-67, line 65 mentions RF filtering).

With respect to claim 7, Phillips et.al., do not expressly teach: wherein said filter circuit comprises a filter selected from the group consisting of high-pass filter, low-pass filter, band-pass filter, notch filter, and combinations thereof.

However to a person skilled in the art at the time of the invention, high-pass filter(s), low-pass filter (s), band-pass filter(s), notch filter(s), and combinations thereof,

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are known filtering means, therefore it would have been obvious to a person skilled in the art at the time of the invention to modify the system of Phillips et. al., to configure the filter circuit to comprise a band-pass filter since bandpass filters remove unwanted portions of the RF signal.

With respect to claim 9, Phillips et. al., further disclose: wherein said front-end circuit further comprises an intermediate frequency mixing circuit operable to translate said received radio signals to an intermediate frequency band (column 8, lines 36-38, where IF conversion involves mixing the received RF signals so that they are downconverted to IF).

With respect to claim 11, the system obtained based on Phillips and Murphy includes: wherein said digital down converter selects said at least one of said channels according to configurable channel selection parameters (see column 26, lines 29-31, 41-44, where the configurable parameter is the frequency used for frequency tuning (during the tune period shown in Fig. 6, see column 23, lines 34-39) to select the LO, GS channels).

With respect to claim 12, the system obtained based on Phillips and Murphy includes: wherein said configurable channel selection parameters are software configurable (see column 22, lines 61-67, column 23, lines 1-4, and column 11, lines 49-

51, where the DSP executes a RAM program to perform the ILC processing the involves using different tuning frequencies for the LO, GS signals).

With respect to claim 13, all of the limitations of claim 13 are rejected above in claim 11 (see frequency tuning i.e. the channel frequency is changed).

With respect to claim 14, Phillips further discloses: wherein said digital signal processor extracts said information from said at least one of said selected channels according to configurable channel decoding parameters (see column 2, lines 51-56, where received waveforms of various combinations of amplitude, frequency, and phase modulations are processed, see column 21, lines 58-665, where demodulation of any combination of amplitude, frequency, and phase modulation corresponding to the channel decoding parameters, is performed by DSP 216 ).

With respect to claim 15, Phillips et. al. further disclose: wherein said configurable channel decoding parameters are software configurable (see column 22, lines 61-67, column 23, lines 1-4, and column 11, lines 49-51, where the DSP executes a RAM program to perform the ILC processing including demodulation/decoding).

With respect to claim 16, Phillips et. al., further disclose: wherein said configurable channel decoding parameters are selected from the group consisting of channel frequency, channel modulation scheme, channel bandwidth, channel



information format, and combinations thereof (see channel modulation scheme, column 21, lines 58-665, where demodulation of any combination of amplitude, frequency, and phase modulation).

With respect to claim 18, Phillips et. al. disclose: at least one front-end circuit group comprising a plurality of front-end circuits (Fig. 3, where the front-end circuit group is shown as block 103 "AIU" antenna interface unit (including processing prior to the analog submodule see column 20, lines 58-67) where the AIU includes LOC, MB, GS antennas (not shown) see column 25, lines 31-41, and these antennas are tuned for the Localizer, Marker Beacon and Glideslope signals (used for landing) that have different frequency bands) wherein each of said front-end circuits is operable to receive a plurality of radio signals transmitted across a frequency band and generate an analog signal within said frequency band (each one of the three antennas for the LO, MB, GS signals each one produces analog signals and in each frequency range) at least one analog to digital converter coupled to said at least one front-end circuit group (see Fig. 8A, block 200 or 202, selection of either the WB ADC converter or NB ADC converter, either one of the ADC is coupled to the 104 block which in turn is coupled to the AIU as shown in Fig. 3A), said analog to digital converter operable to receive said analog signal from said front-end circuits and convert said analog signal to a digital signal (see column 25, lines 31-40, where the signals out of the antennas (AIUs) can be combined for further processing into the PCRM (Programmable Common Receiver Module 100) shown in Fig. 1); and a digital processing system coupled to said at least one analog to

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digital converter (Fig. 3A, see functional blocks after digital signal conversion), said digital processing system operable to receive said digital signal from said analog to digital converter and generate at least one output signal (see column 25, lines 60-67, and column 26, lines 1-15, see also column 23, lines 34-39 where the LO, MB, and GS signals (the specific LO, MB, GS channel in their respective frequency bands) are processed in a time domain sequence) and ; wherein said radio signals received by any one of said front-end circuits are within a different frequency band than said radio signals received by the other of said front-end circuits (see above where the LO, MB, GS antennas have different ranges corresponding to where the localizer, Marker beacon, and glideslope signals are located).

Phillips et. al. do not expressly teach: a plurality of channels within said frequency band; a digital processing system operable to generate at least one output signal corresponding to at least one of said plurality of channels.

In the same field of endeavor, Murphy et. al. disclose: a plurality of channels within said frequency band (see page 21, middle of right side column, where in the VHF band (frequency range of 108.10-111.95MHz) exist 40 Localizer channels, see also 40 glideslope channels in another frequency range).

Therefore at the time of the invention, it would have been obvious to a person skilled in the art based on the teachings of Murphy et. al. that the system of Phillips includes a plurality of channels within said frequency band (40 channels of LO or 40 channels of GS), and therefore it would have been obvious to a person skilled in the art to modify the system of Phillips et. al. so that the a digital processing system is operable

to generate at least one output signal corresponding to at least one of said plurality of signals; and the digital signal processor operable to extract said at least information from said at least one of said channels, i.e. process the channel out of the 40 channels of the LO or GS received signals that is used, and the motivation to perform the above modification is to extract information from the specific channel (out of the plurality of channel in the frequency band) that is used i.e. contains useful information.

With respect to claim 19, all of the limitations of claim 19 are analyzed above in claim 18 (see TDM multiplex processing performed during ILS processing, see column 23, lines 34-39).

With respect to claims 21-23, 24, 25, 26, and 27, these claims are rejected based on a rationale similar to the one used to reject claims 5-7, 9, 11, and 14 respectively.

With respect to claim 28, the system obtained based on Phillips and Murphy does not expressly teach: comprising a plurality of front-end circuit groups and a plurality of corresponding analog to digital converters, wherein said digital processing system is operable to receive a plurality of digital signals from said analog to digital converters and generate at least one output signal corresponding to at least one of said channels within said frequency band of at least one of said front-end circuits of at least one of said front-end circuit groups.

However, at the time of the invention, it would have been obvious to a person skilled in the art to modify the system of Phillips and Murphy, so that it comprises a plurality of front-end circuit groups (instead of the one circuit group (receiving signals LO, GS) which is taught by Phillips and Murphy, two circuit groups each of which receives signals LO, GS (duplicate circuit)) of the circuit group taught by Phillips and Murphy) and a plurality of corresponding analog to digital converters, wherein said digital processing system is operable to receive a plurality of digital signals from said analog to digital converters and generate at least one output signal corresponding to at least one of said channels within said frequency band of at least one of said front-end circuits of at least one of said front-end circuit groups (duplicates of the processing components up to digital submodule 106b of Fig. 1 corresponding to the duplicate second front-send circuit group).

The motivation behind such a modification is that a plurality (two) front-end circuit groups (and A/D) would have been obvious to a person skilled in the art as a back-up front-end circuit group and A/D converter, in case a malfunction of the first front-end circuit group and A/D converter occurs.

With respect to claim 29, claim 29 is rejected based on a rationale similar to the one used to reject claim 18 above, and with respect to the limitation: "...a plurality of analog to digital converter each of which is coupled to at least one of said front end circuit..." see Fig. 3A of Phillips where two ADC are shown 200 (wide band ADC), and

202 (narrowband ADC) converting either the received narrowband or wideband signals (not at the same time though).

With respect to claims 30-31, these are rejected based on rationale similar to the one used to reject claims 22-23 above.

With respect to claim 33, Phillips further discloses: wherein at least one of said analog to digital converters is operable to receive analog signals from a plurality of front-end circuits and convert said analog signals to a digital signal (see column 19, lines 65-67, where ILS processing (see column 22, lines 62-64 involving signals LOC, MB, GS from respective antennas) is narrowband i.e. the NB ADC is used).

With respect to claims 34, 35, 36, 37, 38, 39, 40, 41-42, these claims are rejected based on a rationale similar to the one used to reject claims 18, 22, 23, 24, (25&27), 2, 3, 4, 4, respectively.

With respect to claim 43, Phillips discloses: a plurality of front-end circuits (Fig. 3, where the front-end circuit group is shown as block 103 "AIU" antenna interface unit (including processing prior to the analog submodule see column 20, lines 58-67) where the AIU includes LOC, MB, GS antennas (not shown) see column 25, lines 31-41, and these antennas are tuned for the Localizer, Marker Beacon and Gliseslope signals (used for landing) that have different frequency bands) each of which is operable to

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receive a plurality of radio signals transmitted across a frequency band and generate analog signals that are combined into a composite analog signal corresponding within said frequency band (see column 25, lines 39-41, see addition of antenna inputs (analog singals)); a single analog to digital converter operable to receive the composite analog signal and convert the composite analog signal to a single digital signal (see column 25, lines 50-52, the NB ADC is used); a digital processing system operable to receive said digital signal from said analog to digital converter and generate at least one output signal within said frequency band (see column 25, lines 60-61 the ILS processing and column 23, lines 124-36, digital processing of ILS signals).

Phillips et. al. do not expressly teach: corresponding to a plurality of channels within said frequency band; a digital processing system operable to generate at least one output signal corresponding to at least one of said channels.

In the same field of endeavor, a plurality of channels within said frequency band (see page 21, middle of right side column, where in the VHF band (frequency range of 108.10-111.95MHz) exist 40 Localizer channels, see also 40 glideslope channels in another frequency range).

At the time of the invention, it would have been obvious to a person skilled in the art based on the teachings of Murphy et. al. that the system of Phillips includes a plurality of channels within said frequency band (40 channels of LO plus the 40 channels of GS since the signals are combined), and therefore it would have been obvious to a person skilled in the art to modify the system of Phillips et. al. so that the a digital processing system is operable to generate at least one output signal

corresponding to at least one of said plurality of signals; and the digital signal processor operable to extract said at least information from said at least one of said channels, i.e. process the channel out of the 40 channels of the LO (or the 40 GS channels) received signals that is used, and the motivation to perform the above modification is to extract information from the specific channel (out of the plurality of channel in the frequency band) that is used i.e. contains useful information.

With respect to claim 44, claim 44 Phillips discloses: wherein said output signal comprises a time-domain multiplexed serial data link (see column 23, lines 34-37 and Fig. 6 where the signals are processed in a time-domain multiplex fashion and therefore the output of the digital processing system is also TDM).

With respect to claim 45, Phillips further discloses: further comprising means for generating a plurality of signals from said time-domain multiplexed serial data link for transmission to a plurality of end devices (Fig. 8B, serial interface 114 (UART), see column 12, lines 60-67, also column 7, lines 47-55, where the plurality of signals are the signals out of the serial interface (UART) transmitted to the various computer components as shown in Fig. 8B).

With respect to claim 46 claim 46 is rejected based on a rationale similar to the one used to reject claim 1 above, and Murphy et. al., further disclose: wherein said frequency band comprises aviation band radio signals (see middle of right side column

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on page 21, where the aviation signals (referred to as LO in the Phillips et.al. reference)(see localizer frequency band 108.10-111.95MHz) and Glide slope (GS in the Phillips et. al. reference) spans 326.6-335.4Mhz frequency range).

With respect to claim 47, Murphy et. al. further disclose: wherein said aviation-band radio signals comprise aviation navigation radio signals (see right side column of page 21, where the localizer provides navigation information about the runway center line).

With respect to claim 48, Phillips et. al. further disclose: wherein said aviation-band radio signals comprise aviation communication radio signals (see column 2, lines 51-55, and see column 39, lines 56-66, where the VHF-AM signal is a communication signal).

With respect to claim 49, claim 49 is rejected under a rationale similar to the one used to reject claims 47 and 49.

With respect to claims 50-52, these claims are rejected based on a rationale similar to the one used to reject claims 2-4 respectively.

With respect to claim 53, claim 53 is rejected based on a rationale similar to the one used to reject claim 22 above and Phillips discloses the limitation: "wherein said



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radio signals comprise aviation navigation and aviation communication radio signals”  
(see column 2, lines 51-56, received analog waveforms include (aviation)  
communication and navigation signals, (i.e. aviation cni signals)).

With respect to claims 54 and 56, claims 54 and 56 are rejected based on a rationale similar to the one used to reject claims 19 and 25 (respectively) above.

With respect to claim 57, claim 57 is rejected based on rationale similar to the one used to reject apparatus claim 53 above (assuming one front-end circuit group that comprises a plurality of front-end circuits)).

With respect to claim 58, Phillips further discloses: further comprising mixing said received radio signals to an intermediate frequency band (column 8, lines 36-38, where IF conversion involves mixing the received rf signals so that they are downconverted to IF).

With respect to claim 59, Phillips further discloses: wherein said output signal is generated by: applying software configurable channel selection parameters to said digital signal to select at least one of said digitized channels within said frequency band; extracting information from said at least one of said selected digitized channels according to software configurable channel decoding parameters; and conveying said extracted information within said output signal.

***Conclusion***

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Tsurumi et. al., (U.S. 6,334,051) discloses a programmable receiver.

***Contact Information***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SOPHIA VLAHOS whose telephone number is 571 272 5507. The examiner can normally be reached on MTWRF 8:30-17:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammed Ghayour can be reached on 571 272 3021. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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**MOHAMMED GHAYOUR**  
**SUPERVISORY PATENT EXAMINER**